

Lasiodiamesa gracilis (Chironomidae: Podonominae) new for the Dutch fauna

Lasiodiamesa gracilis is recorded for the first time from The Netherlands. During a research program aimed at evaluating the effects of restoration of bog remnants, larvae were collected in Korenburgerveen and Wooldse Veen, province of Gelderland. After rearing several larvae, adult males were identified as *L. gracilis*. Distinguishing characters for larvae are given, as well as structural differences in the male genitalia. In addition, attention is paid to the ecology and geographical distribution. The populations at Korenburgerveen and Wooldse Veen are probably glacial relicts, which remained after the ice-sheet retreated at the end of the Würm-glaciation.

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Introduction

During a research program aimed at evaluating the effects of restoration of bog remnants, aquatic invertebrates were collected. During visits in 1999, 2000 and 2002 more than 100 larvae (in 30 bog puddles) of the genus *Lasiodiamesa* (Chironomidae: Podonominae) were found in the bog remnants Korenburgerveen and Wooldse Veen, both in the province of Gelderland. This genus is very rare in The Netherlands; in fact, only one record of larvae of *Lasiodiamesa* sp. is known from the raised bog remnant Mariapeel, Noord-Brabant, but the precise location is unknown. The larvae cannot be identified to species level. After about 25 larvae were raised to adulthood, all adult males were identified as *Lasiodiamesa gracilis* (Kieffer) using Brundin (1966). To ensure correct identification, specimens were checked, and their identity confirmed, by the chironomid specialist P.H. Langton. This species is recorded for the first time in The Netherlands.

Korenburgerveen is a nature reserve located northeast of Winterswijk and has many different biotopes (e.g. raised bog, heathland and alder swamp); it is well-known for its high species diversity. Currently, measures are taken focusing on restoration of the raised part of the bog by retaining rain water and limiting inflow of nutrient-rich water from adjacent agricultural areas. Wooldse Veen, also a nature reserve, is located south of Winterswijk and is less heterogenous. Here comparable restoration measures are being planned, also focusing on restoration of the raised part of the bog.

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Identification

The larvae of the genus *Lasiodiamesa* are easily distinguished from other Chironomidae larvae: they are coloured purple, and the segments are clearly delineated (figure 1). The pro-cerci (brush pedestals) on the anal segment are elongated (8-10 times as high as wide) and the brush consists of about thirteen fairly short setae. Other abdominal setae are poorly developed. Other characteristics include a labium with one large middle tooth and twelve pairs of lateral teeth and a ringed third antennal segment (Brundin 1966).



Figure 1. Larva of *Lasiodiamesa* sp.. Photo: René Krekels
Larve van *Lasiodiamesa* sp..

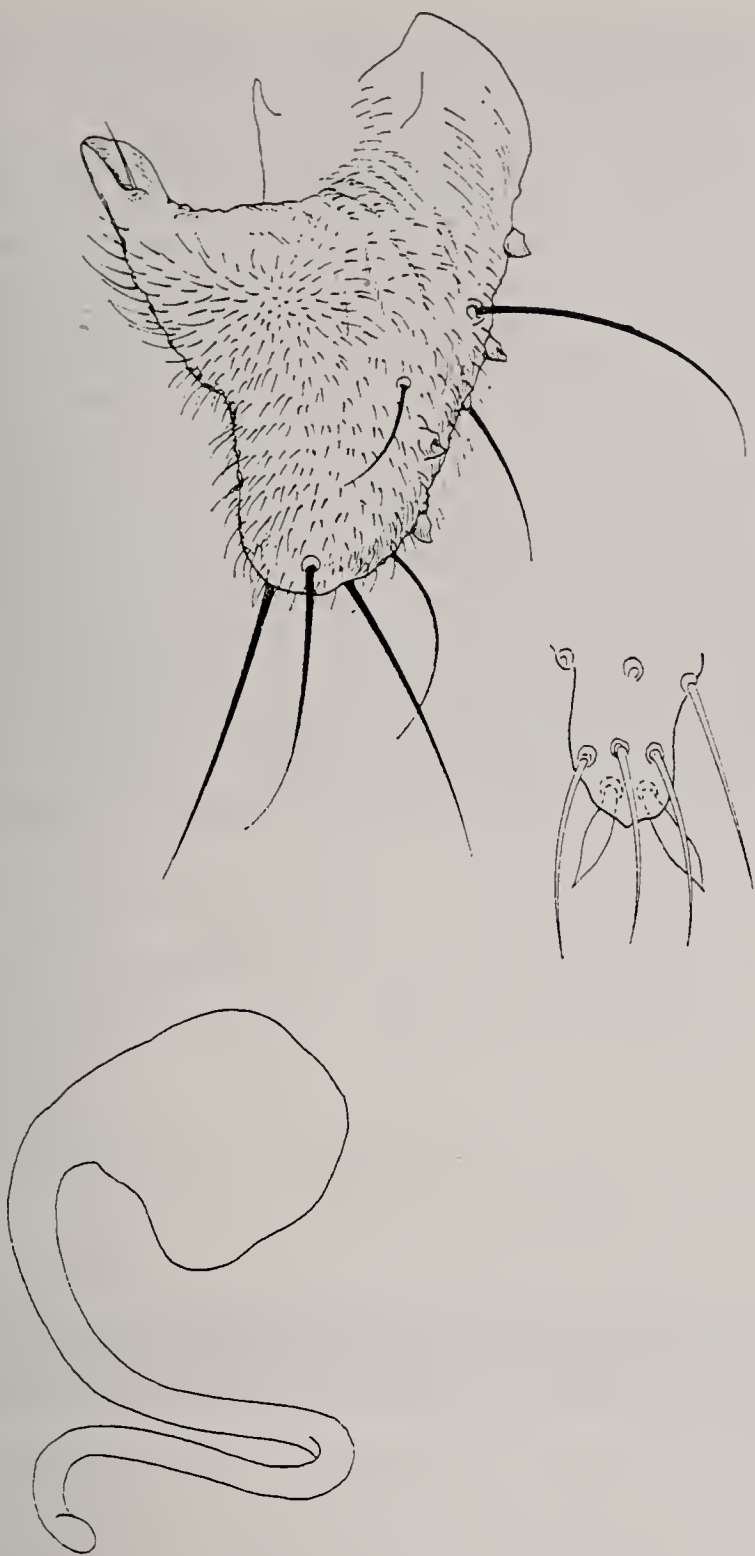


Figure 2. Upper: anal point of the male tergite IX in *Lasiodiamesa gracilis*, with the two lancet-shaped setae; centre: dististyle of male *L. gracilis* with the basal portion prolonged into a well-marked 'heel' at the bottom of the figure; lower: right paramere of *L. gracilis* (figures from Brundin 1966).
 Boven: de punt van het negende tergiet heeft bij mannetjes van *Lasiodiamesa gracilis* twee lancetvormige setae;
 midden: de dististylus van een mannetje *L. gracilis* bevat een duidelijke uitstulping die in deze figuur naar beneden wijst;
 onder: rechter parameer van *L. gracilis* (figuren uit Brundin 1966).

Only adult males can be identified to species level. Discriminating characteristics between the species are located in the hypopygium. Tergite IX has a short, blunt-tipped anal point, carrying two lancet-shaped setae at the tip (figure 2). The apical portion of the parameres is very slender and S-shaped (figure 2). Dististyles are built compactly and their basal portion is prolonged into a well-marked 'heel' (figure 2). For more details on morphological characteristics in *L. gracilis* and other species of this genus, see Brundin (1966).

Ecology

Information on the biology of *L. gracilis* is scarce. The genus stands out ecologically as a separate group. The larvae and pupae of *Lasiodiamesa* are well-fitted for life in standing water. Pupae are especially adapted to swimming and resemble certain pupae of Tanypodinae and Culicidae. The larvae prefer bogs (Brundin 1966). In Korenburgerveen and Wooldse Veen larvae were most abundant in shallow puddles with a rather dense vegetation of *Sphagnum cuspidatum* and *Eriophorum vaginatum*. Highest densities were recorded in a puddle at the transition of vegetation and small unvegetated spots.

In Estonian bogs larvae of *Lasiodiamesa* spec. were found in the lagg zone of the bog (Bargerveen foundation, unpublished data). Compared to the centre of the raised bog the lagg zone is more influenced by minerotrophic water (i.e. ground or surface water rich in minerals). This is also in agreement with the larval habitat of *L. sphagnicola* on west Clara Bog as described by Ashe (1987): *Sphagnum* pools near birch (*Betula pubescens*) of about 0.5-1 m long, 0.3 m wide, shallow and associated with a slight flush (i.e. surface water movement or trickles which may be minerotrophic). Minerotrophic environments have a higher alkalinity (the capacity to buffer acids). Although the term does not refer directly to the nutrient levels of nitrogen (N) and phosphorus (P), a higher alkalinity can increase the decomposition rate, resulting in a higher availability of nutrients in minerotrophic environments.

Digestive tract analysis on larvae (n = 5) from different localities in Korenburgerveen (with high and low algal bloom) revealed that gut contents consisted of algae only, with no sign of animal life (e.g. rotifers, cladocerans), suggesting that the species feeds on algae, a likely available food source in slightly enriched bog pools.

Larvae were collected in spring, autumn and winter (February). On all occasions the larvae measured 5 mm and readily became pupae. Brundin (1983) lists a size of 5-8 mm for fourth instar larvae. From this it can be concluded that most larvae were in their fourth instar. Pupae were found in late spring (until mid-May, after which no larvae or pupae were found), but not in autumn. This suggests that the species is univoltine, with adults emerging in late spring and larvae overwintering. This however cannot be stated with certainty, as relatively few visits were undertaken in autumn and winter.

Distribution

The genus *Lasiodiamesa* mainly occurs in the broad birch-coniferous belt of the boreal zone. It is known from Fennoscandia, northern Russia, Baltic states, Poland, Germany, British Isles, Canada and the USA. The southern disjunct populations in Central Europe seem to be confined to *Sphagnum* bogs and are therefore assumed to be glacial relicts, which remained after the ice retreated at the end of the Würm-glaciation (Brundin 1966).

Most of the above occurrences refer to *L. sphagnicola*, which is distributed over North and Central Europe, including Britain and Ireland (Ashe 1987). *Lasiodiamesa gracilis* however was known only from the northeastern parts of Central Europe and from North Europe (Southwest Poland, Swedish Lapland and South Sweden). The record of this spe-

cies in The Netherlands is an extension of the distribution. This is probably not the result of a range expansion: one reason why it has not been recorded earlier is because the habitat is poorly studied. Nevertheless, samples in six other raised bog remnants throughout The Netherlands have yielded no success (Van Duinen *et al.* in press). Therefore, the fact that the species was not recorded previously can also be attributed to the rareness of the species. Thus the species shows a highly fragmented distribution pattern, occupying a limited number of raised bog remnants, where it may locally be quite common. Relict populations are often very rare at the regional level and can be common at the local level, supporting the idea that the populations of *Lasiodiamesa gracilis* are glacial relict populations (or metapopulations, if the population at Korenburgerveen and Wooldse Veen are considered subpopulations). This raises some questions: What is the history of Korenburgerveen and Wooldse Veen or what special environmental conditions are present enabling the populations to persist? What is the ecology (e.g. adult dispersion capability, larval habitat requirements) of *L. gracilis*? What are the effects of the restoration measures on the environmental conditions and the persistence of *L. gracilis*? These are questions we hope to deal with in a further study, which will focus more on the ecology and distribution.

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Samenvatting

Lasiodiamesa gracilis (Chironomidae: Podonominae), een nieuwe dansmug voor de Nederlandse fauna

De dansmug *Lasiodiamesa gracilis* wordt voor het eerst uit Nederland gemeld. Tijdens bemonsteringen ten behoeve van een evaluatie van herstelmaatregelen is de soort aangetroffen in het Korenburgerveen en later eveneens in het Wooldse Veen, beide in de Achterhoek, Gelderland. Aangezien alleen de adulte mannetjes tot op soort gedetermineerd kunnen worden zijn enkele larven opgekeukt. Determinatiekenmerken voor de larven en de adulte mannetjes, alsmede habitatomschrijving, ecologie en verspreiding van de soort worden besproken. Deze nieuwe vondst betekent een uitbreiding van het verspreidingsgebied. Een van de redenen dat de soort niet eerder uit Nederland is gemeld is dat hoogveen niet uitvoerig is geïnventariseerd. Het verspreidingsbeeld van *Lasiodiamesa* geeft aan dat de soort nationaal zeer zeldzaam is, maar in het Korenburgerveen vrij algemeen voorkomt. Waarschijnlijk gaat het om relictpopulaties van na de Würm-ijstijd.